

three considerations taken jointly induce me to think that the moon may have an atmosphere, although such may not come within the range of our observation.

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ART. X.—*On the Adaptation of the Eye to the Nature of the Rays which emanate from Bodies.* By BALFOUR STEWART, ESQ.

IN the following remarks I assume, along with Professor Provost, that bodies radiate at all temperatures, only the hotter bodies radiate more than they absorb, and the colder less, until a uniform temperature is at length attained. Now, in the spectrum formed by decomposing a ray of white light by means of a prism, the most refrangible rays are the violet and blue, and the least refrangible of the visible rays are the red; but there are yet a set of less refrangible rays, which though not visible to the eye, have the power of raising the thermometer. I conceive that all bodies at ordinary temperatures emit rays of this description, which are less refrangible than the extreme red of the visible spectrum, and that as the temperature of a body rises, the average refrangibility of the rays it emits rises also, and to the same extent for all bodies, until at almost 600° Fahr. The rays enter the visible spectrum by the extreme red, and the body is now said to be red-hot. And here I may remark, that with regard to the absolute identity of the heating and illuminating rays, I hold the opinion of Professor Powell, expressed in his report on Radiant Heat, in the Transactions of the British Association for 1840, where he says:—

“The question of the identity of the heating and illuminating radiators seems clearly negatived by many experiments, if we mean it to apply in the sense of one physical agent; but, if we refer to the possibility of accounting for the different effects by sets of undulations of the same ætherial medium differing their wave lengths, this probably presents fewer difficulties than any hypothesis of peculiar heat.”

However this may be, if the temperature of a red-hot body be still further increased, the average refrangibility of the rays it emits is also increased to the same extent for all bodies; and it is now said to be white hot. If the heat be still further increased, it requires a greater number of the blue or more refrangible rays; such, for instance, as the lime-ball

light charcoal points in a galvanic battery, and the light of the sun.

Now, although we do not know by what property of the eye rays less refrangible than the extreme red become invisible, yet this will appear on inspection to be a wise arrangement of Providence.

For if the rays which emanate from bodies at ordinary temperatures were invisible they would overpower those exquisitely beautiful colours of nature which are produced by reflection of the solar light; besides which, there would be no such thing as darkness, even when the eye was closed, for light would still issue from the eyelids. And again, if rays did not become visible till at a much higher temperature than  $600^{\circ}$ , combustion would go on in darkness, and we should never be warned of the presence of fire.

Finally, if we suppose a number of bodies (for simplicity's sake spheres) to have been originally at the same temperature, it is clear, that since radiation will vary with the surface exposed, large spheres, the surface of which bears a less proportion to their solid contents than that of smaller ones, will cool more slowly than smaller ones; so that at any given time a large sphere would be at a much higher temperature than a small one, and would, consequently, emanate visible rays, while the rays of the other would be invisible.

Therefore, in a system of bodies, such as the solar system, the centre of attraction is also the centre of illumination which is a most wise and beneficial arrangement.

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ART. XI.—*Descriptive Characters of New Alpine Plants, from Continental Australia. By DR. FERDINAND MUELLER.*

IN offering this small, yet perhaps not unwelcome contribution towards the botany of Australia, I wished to conclude the precursory diagnostic notes on our Alpine flora, of which some scattered fragments appeared in this journal, and in the papers of the Victorian Institute.\*

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\* The plants there enumerated and described are the following:—*Eriostemon lancifolius*, *P. phyllicifolium*, *Phebalium ozothamnoides*, *Ph. podocarpoides*, *Crowea exalata*, *Scleranthus miaroides*, *Kunzea ericifolia*, *Burtona subalpina*, *Oxylobium alpestre*, *Bossiaea distichoclada*, *Eurybia megalophylla*, *Eurybia alpicolo*, *Brachycome multicaulis*, *Br. nivalis*, *Antennaria nubigena*, *Gnaphalium alpigenum*, *Agrostis nivalis*, *Agr. frigida*, *Agr. gelida*, *Danthonia robusta*, *Hierochloa submutica*, and *Astelia psychrocharis*. A few as doubtful remained yet uncharacterized.